NASA Procedural Requirements

COMPLIANCE IS MANDATORY

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Subject: NASA Procedural Requirements for Limiting Orbital Debris (w/ Change 1 - 5/14/09)

Responsible Office: Office of Safety and Mission Assurance

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Preface

P.1 Purpose

P.1.1 The purpose of this NASA Procedural Requirements (NPR) is to provide requirements to implement NASA's policy for limiting orbital debris generation per the U.S. National Space Policy of 2006, Section 11, the U.S. Government Orbital Debris Mitigation Standard Practices, and as a part of NASA's policy for safety and mission assurance programs as defined in NASA Policy Directive (NPD) 8700.1, paragraph 1a. Any noncompliances to orbital debris requirements, including those for reasons of mission requirements and cost effectiveness, require a variance to this NPR.

P.1.2 The U.S. National Space Policy of 2006, Section 11, states:

"Orbital debris poses a risk to continued reliable use of space-based services and operations and to the safety of persons and property in space and on Earth. The United States shall seek to minimize the creation of orbital debris by government and non-government operations in space in order to preserve the space environment for future generations. Toward that end: - Departments and agencies shall continue to follow the United States Government Orbital Debris Mitigation Standard Practices, consistent with mission requirements and cost effectiveness, in the procurement and operation of spacecraft, launch services, and the operation or tests and experiments in space; - The Secretaries of Commerce and Transportation, in coordination with the Chairman of the Federal Communications Commission, shall continue to address orbital debris issues through their respective licensing procedures; and - The United States shall take a leadership role in international fora to encourage foreign nations and international organizations to adopt policies and practices aimed at debris minimization

and shall cooperate in the exchange of information on debris research and the identification of improved debris mitigation practices."

P.1.3 The U.S. Government Orbital Debris Mitigation Standard Practices provides guidance on what areas to include in an orbital debris program.

P.1.4 NPD 8700.1, NASA Policy for Safety and Mission Success, addresses the inclusion of Safety and Mission Assurance (SMA) as an integral part of every NASA program and project to protect the public, NASA workforce, high-value equipment and property, and the environment. Orbital debris is stated as one of the SMA disciplines to be included.

P.1.5 This NPR specifies how to implement requirements and responsibilities for limiting orbital debris as a part of the NASA program/project and NASA SMA activities, including requirements on orbital debris assessments (ODA), reporting, and engineering processes. Those requirements and responsibilities for limiting orbital debris which are solely the responsibility of NASA personnel are defined in this NPR. As companions to this NPR, NASA Safety Standard (NSS) 1740.14, Guidelines and Assessment Procedures for Limiting Orbital Debris; NASA Standard (NASA-STD) 8719.14, Process for Limiting Orbital Debris; and NASA-Handbook (NHBK) 8719.14, Handbook for Limiting Orbital Debris, provide details on orbital debris assessments (ODA), reporting, and engineering processes needed for limiting orbital debris.

P.1.6 This NPR, the associated NSS 1740.14, NASA-STD 8719.14, and NHBK 8719.14 are the NASA implementation of the applicable documents listed in paragraph P.4. Full implementation and compliance with this document will ensure NASA compliance with the applicable documents in paragraph P.4, to the extent cited in this NPR.

P.1.7 This NPR shall not be construed as conferring upon any international body, agency, or committee the right to place upon the U. S. Government or NASA any restrictions or conditions as to its space operations unless required by separate agreement or treaty.

P.2 Applicability

P.2.1 This NPR is applicable to NASA Headquarters and Centers, including Component Facilities; the Jet Propulsion Laboratory, and other NASA contractors and grantees as specified in their contracts or grants; and to other organizations (i.e., commercial partners, other Federal agencies, educational institutions, international parties, and tenants on Centers) as specified and described in written operating agreements.

P.2.2 This NPR is applicable to all objects launched into space in which NASA has lead involvement and control or has partial involvement with control over design or operations via U.S. internal or international partnership agreements, including the launch vehicle. This document has no automatic exclusions for any program or project due to limited funding, responsibility, or involvement of NASA in the program or project. NASA involvement includes design, manufacture, or funding of instruments, spacecraft bus, spacecraft systems, and the launch vehicle and includes launch processing. Additionally, this NPR only applies to objects which exceed 100km (~62mi) in altitude and achieve or exceed Earth orbital velocity.

> *Note: It is recognized that NASA has no involvement or control in the design or operation of Federal Aviation Administration (FAA)-licensed*

launches or foreign or Department of Defense (DoD)-furnished launch services, and, therefore, these are not subject to the requirements in this NPR for the launch portion. This currently applies to Commercial Orbital Transportation Services (COTS), International Space Station (ISS) Commercial Resupply Services (CRS), and some NASA payloads for which unique launch services have been or plan to be acquired; e.g., Geostationary Operational Environmental Satellite (GOES-O), James Webb Space Telescope (JWST), and Lunar Atmosphere and Dust Environment Explorer (LADEE). Such launches are under the authority of other Federal agencies (FAA or DoD) or foreign governments for direction and compliance of applicable orbital debris requirements. The payloads of such missions; e.g., COTS and CRS orbital vehicles and GOES-O, JWST, and LADEE spacecraft, that have a NASA involvement in the design and operation, are subject to the requirements of this document and process. It is intended that COTS and CRS launch vehicle stages or spacecraft carrying NASA cargo, that will be in the proximity of the ISS or could leave debris near ISS orbit, would be reviewed per the requirements in this document as a part of the approval process to approach the ISS.

P.2.3 A requirement is identified by the word "shall." The word "may" is used to denote permission.

P.2.4 The following subparagraphs (a-e below) limit the scope of this NPR:

a. NASA spacecraft, launch vehicles, and instruments that passed Preliminary Design Review (PDR) prior to August 1995 (release of NSS 1740.14, Guidelines and Assessment Procedures for Limiting Orbital Debris) are not required to perform an ODA unless a large change in design, as determined by the SMA Technical Authority, or changes in space object capability or risk affect the ability to achieve compliance with the requirements. If one or more of these conditions occur, an ODA Report (ODAR) shall be performed (Requirement 57283).

b. Programs/projects that passed mission PDR, as of November 1, 2007, may elect to follow the mission and hardware design and operation requirements of this NPR and the procedures in either NSS 1740.14 or NASA-STD 8719.14 for ODARs.

Note: For future changes to this NPR and its companion NASA Standard, programs may request a waiver to the new requirements per NPR 8715.3, paragraph 1.13.

Note: Programs using the NSS 1740.14 may continue to use Chapter 8 for the ODAR format or use the format in NASA-STD 8719.14 Appendix A. The format in NASA-STD 8719.14 is preferred.

c. Programs that launched prior to December 31, 2007, are not required to submit the prelaunch End-of-Mission (EOM) Plans (EOMP), but are required to submit an EOMP for operational portions of the mission.

Note: Programs using NSS 1740.14 may either submit a full ODAR, per NSS 1740.14 Chapter 8.2, or the format specified in NASA-STD 8719.14 Appendix B. The format in NASA-STD 8719.14 is preferred.

d. Programs with EOM prior to December 31, 2007, are not required to submit an EOMP; however, it is desirable to develop an EOMP in conjunction with performing the requirements contained in NPD 8010.3, Notification of Intent to Decommission or Terminate Operating Space Systems and Terminate Missions.

e. All applicable programs/projects not listed in paragraphs P.2.4.a through P.2.4.d shall use NASA-STD 8719.14 (Requirement 57290).

P.2.5 While this NPR has no automatic exclusions for any spaceflight program or project, it is recognized that the current state of spacecraft and launch vehicles precludes total compliance. For noncompliances, the spaceflight program or project shall assess the overall cost and technical impacts as described in paragraph 2.2.4 of this NPR to justify the noncompliance(Requirement 57291).

> *Note: The process for requesting and granting of waivers and/or exceptions to the requirements in this NPR, NSS 1740.14, and NASA-STD 8719.14 is defined in NPR 8715.3, paragraph 1.13.*
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> *Note: The clause in the U.S. National Space Policy of 2010, Section 11, which states "consistent with mission requirements and cost effectiveness" will be used in adjudication of requests for relief from the requirement in this NPR when specified by the program's rationale for the waiver/exception.*

P.2.6 Orbital debris requirements for space vehicles and spacecraft while operating beyond Earth orbit are identified within this NPR.

P.2.7 NASA-STD 8719.14 applies to system developers at NASA and shall be applied to system developers under contract to NASA for all space-related mission portions being developed by NASA unless paragraph P.2.4 permits use of NSS 1740.14.

P.3 Authority

a. 42 U.S.C. S 2473 (c)(1), Section 203 (c)(1) of the National Aeronautics and Space Act of 1958, as amended.

b. U.S. National Space Policy, August 31, 2006.

c. NPD 8700.1, NASA Policy for Safety and Mission Success.

P.4 Applicable Documents

a. U.S. Government Orbital Debris Mitigation Standard Practices, February 2001.

b. NPD 8010.3, Notification of Intent to Decommission or Terminate Operating Space Systems and Terminate Missions.

c. NPD 8020.7, Biological Contamination Control for Outbound and Inbound Planetary Spacecraft.

d. NPR 7120.5, NASA Space Flight Program and Project Management Requirements.

e. NPR 8000.4, Risk Management Procedural Requirements.

f. NPR 8020.12, Planetary Protection Provisions for Robotic Extraterrestrial Missions.

g. NPR 8705.5, Probabilistic Risk Assessment (PRA) Procedures for NASA Programs and Projects.

h. NPR 8705.6, Safety and Mission Assurance Audits, Reviews, and Assessments.

i. NPR 8715.3, NASA General Safety Program Requirements.

j. NSS 1740.14, Guidelines and Assessment Procedures for Limiting Orbital Debris.

k. NASA Standard (NASA-STD) 8719.14, Process for Limiting Orbital Debris.

l. NASA Handbook 8719.14, Handbook for Limiting Orbital Debris.

2. Technical Report on Space Debris, Scientific and Technical Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space, A/AC.105/720, 1999. http://www.unoosa.org/oosa/natact/sdnps/sd_nps_docsidx.html

m. IADC-02-01, Space Debris Mitigation Guidelines, Inter-Agency Space Debris Coordination Committee, October 15, 2002. http://www.iadc-online.org/index.cgi?item=docs_pub

P.5 Measurement/Verification

Compliance with the requirements contained in this NPR will be verified through processes contained in NPR 8705.6, Safety and Mission Assurance Audits, Reviews, and Assessments.

P.6 Cancellation

NPR 8715.6, dated August 17, 2007.

/S/
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